

A2 said graphite flake is subjected to electrolytical oxidization with an aqueous intercalant solution that comprises 10-75% sulfuric acid and from about 30 to about 85% water by weight of the solution.

REMARKS

Status of the Claims

Claims 1-20 are cancelled. Claims 21-40 are added.

The Present Invention

The present invention is directed to a process for preparing an intercalated graphite flake having excellent exfoliation characteristics. Furthermore, the present invention is directed to an intercalated graphite flake that is produced by the process of the present invention.

The Parent Application

This application is a continuation of, and claims priority to, U.S. Application Serial Number 09/641,835, now allowed. In the parent application, a rejection was mailed by the Office which raised several issues with respect to 35 U.S.C. §§ 102, 103. While some of these issues were addressed in the 37 C.F.R. § 1.111 Amendment in the parent

application, to expedite allowance of the parent application allowed subject matter was amended into rejected claims.

In an effort to expedite the prosecution of the instant application, the remaining issues with respect to the parent application are addressed below for the consideration of the Examiner.

Issues under 35 U.S.C. § 102

Claims 16-19 of the parent application, corresponding to new claims 34-40 of the instant application were rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Yoshida et al. Reconsideration of this position with respect to this application is respectfully requested.

In order to anticipate a claim, the reference must teach each and every element of the claim. See MPEP § 2131.

Yoshida et al. fail to disclose or suggest an intercalated graphite flake which is subjected to electrolytic oxidation with aqueous intercalant solution that comprises 10 to 75% of sulfuric acid.

The intercalated stage one flakes of Yoshida et al., produced by the chemical reaction with concentrated sulfuric and nitric acid, can be differentiated from the flakes of the present invention by an analysis of the intercalant present in the galleries of the intercalated flakes. The Yoshida et al. intercalated flakes will contain much higher concentrations of internal sulfuric acid (less water) since concentrated

sulfuric acid was experimentally employed. The electrochemical intercalations utilized in the present invention have lower concentration of sulfuric acid.

The Examiner states in the Office Action that “the patentability of a product by process claim does not depend on its method of production and where the Examiner has found a similar product, the burden rests with the Applicant to prove that the product is patently distinct.”

However, the claims as written in the present application should not be solely considered as product-by-process claims.

Some apparent process limitations, such as “etched,” “welded,” “interbonded by interfusion,” are considered structural limitations not subject to the product-by-process rules. See In re Garnero, 162 U.S.P.Q. 221, 223 (CCPA 1969).

Additionally, “chemically engraved,” read in context, was held to have described the product more by its structure than the process used to obtain it. See Hazani v. United States Int’l Trade Comm’n., 44 U.S.P.Q.2d 1358, 1363 (Fed. Cir. 1997).

Thus, “subjected to electrolytical oxidation...” like “interbonded by interfusion” may be considered as structural limitations not subject to the product-by-process rules. Also, the Examiner should note that these claims (new claims 34-40) have been rewritten to more clearly recite these features.

Claims 16-19 of the parent application were also rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Zhang et al. Reconsideration of this position with respect to this application is respectfully requested.

The intercalated stage one flakes of Zhang et al., produced by chemical reaction with iron chloride in propylene carbonate can be differentiated from the present invention by an analysis of the intercalant present in the galleries of the intercalated flakes. The Zhang et al. intercalated flakes would contain iron chloride and propylene carbonate, and fail to contain the claimed concentrations of sulfuric acid.

Claims 16-19 of the parent application were also rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Kang et al. Reconsideration of this position with respect to this application is respectfully requested.

The intercalated stage one flakes of Kang et al. produced by electrochemical intercalation with pure formic acid can be differentiated from the flakes of the present invention by an analysis of the intercalant present in the galleries of the intercalated flakes. The Kang et al. intercalated flakes would contain formic acid and fail to contain the claimed concentrations of sulfuric acid.

Claim 20 of the parent application was rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Yoshida et al. Reconsideration of this position with respect to this application is respectfully requested.

Yoshida et al. fail to disclose or suggest an intercalated flake with the characteristics described in new claim 34. The Office Action states that “Yoshida teaches an intercalated graphite flake characterized by an intumescent temperature of below about 200° C.” Please note that, in addition to the deficiencies with respect to new claim 34, Applicant’s review of Yoshida et al. revealed no reference to an organic expansion aid with an intumescent temperature below about 200° C in either the experimental section or in Table I, as indicated by the Examiner.

Claim 20 of the parent application was also rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Zhang et al. Reconsideration of this position with respect to this application is respectfully requested.

Zhang et al. fail to disclose or suggest an intercalated flake with the characteristics described in claim 14. The Office Action states that “Zhang teaches an intercalated graphite flake characterized by an intumescent temperature of below about 200° C.” Please note that, in addition to the deficiencies with respect to new claim 34, Applicant’s review of Zhang revealed no reference to organic expansion aids with an

intumescent temperature below about 200° C in either the experimental section or in the text of the reference as indicated by the Examiner.

Claim 20 of the parent application was also rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Kang et al. Reconsideration of this position with respect to this application is respectfully requested.

Kang et al. fail to disclose or suggest an intercalated flake with the characteristics described in new claim 34. The Office Action states that “Kang teaches an intercalated graphite flake characterized by an intumescent temperature of below about 200° C.” Please note that, in addition to the deficiencies with respect to claim 14, Applicant’s review of Zhang revealed no reference to organic expansion aids with an intumescent temperature below about 200° C in either the experimental section or in the text of the reference as indicated by the Examiner.

Claims 1 and 3 of the parent application were rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Zhang et al. Reconsideration of this position with respect to this application is respectfully requested.

The Office Action states that the Zhang et al. reference discloses contacting a graphite flake with an organic expansion aid.

However, the Zhang reference discloses propylene carbonate as an expansion aid. Propylene carbonate is not considered an organic

carboxylic acid expansion aid and is inferior to the expansion aids of the present claims. Additionally, the Office Action states that this reference discloses subjecting the graphite flake to an electrolytic oxidation treatment with an aqueous intercalant solution (electrolyte solutions of FeCl_3). However, a solution of FeCl_3 and propylene carbonate is not an aqueous solution, but rather a nonaqueous solution. In view of such deficiencies, this reference cannot be considered to be anticipatory.

Finally, claims 1, 3, 5-7, and 12 of the parent application were rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Kang et al. Reconsideration of this position with respect to the present application is respectfully requested.

Kang et al. fail to disclose a graphite flake electrolytic oxidation treatment with an aqueous intercalant solution comprising 10-75% sulfuric acid. In view of this deficiency, this reference cannot be considered to be anticipatory.

Issues under 35 U.S.C. § 103

Claims 2, 8-9, and 11-13 of the parent application were rejected under 35 U.S.C. § 103 as allegedly being obvious over Zhang et al. Reconsideration of this position with respect to this Application is requested. The deficiencies of the Zhang et al. reference with respect to the present invention are discussed above.

In order to establish a *prima facie* case of obviousness, there must be some suggestion or motivation to modify the reference to teach or suggest all of the claim limitations with a reasonable expectation of success. See MPEP §2143. In view of the differences stated above, which at least do not suggest all of the claim limitations, a *prima facie* case of obviousness cannot be established with respect to this claim and this rejection.

Claims 2 and 11 of the parent application were rejected under 35 U.S.C. § 103 as allegedly being obvious over Kang et al. Reconsideration of this position with respect to this Application is requested.

In view of the differences stated above, which at least do not suggest all of the claim limitations, a *prima facie* case of obviousness cannot be established with respect to this claim and this rejection.

Finally, claim 13 of the parent application was rejected under 35 U.S.C. § 103 as allegedly being obvious over Kang et al. Reconsideration of this position with respect to this Application is requested.

In view of the differences stated above in connection with this reference, a *prima facie* case of obviousness cannot be established with respect to this claim and this rejection.

Conclusion

From the foregoing, further and favorable reconsideration in the form of a Notice of Allowability is on order, and such action is earnestly solicited.

In an effort to expedite the prosecution of this Application, if there are any issues precluding immediate allowance, or if the Examiner has any questions regarding these Remarks or the Application in general, she is respectfully urged to contact Richard S. Myers, Jr. (Reg. No. 42,022) at the number listed below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and further replies, to charge payment or credit any overpayment to Deposit Account No. 50-1202 for any additional fee required under 37 C.F.R. 1.16 or under 37 C.F.R. 1.17; particularly, extension of time fees.

Respectfully submitted,



Lucian Wayne Beavers
Registration No. 28,183
WADDEY & PATTERSON
A Professional Corporation
414 Union Street, Suite 2020
Bank of America Plaza
Nashville, TN 37219
(615) 242-2400
Customer No. 23456
ATTORNEYS FOR APPLICANT